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USING MULTIPLE CHOICE QUESTIONS TO MEASURE THE EFFECT ON COMPREHENSION OF MATERIAL WRITTEN WITH SELECT ORAL LANGUAGE PATTERNS.

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THE EFFECT OF FREQUENTLY USED ORAL LANGUAGE PATTERNS IN WRITTEN MATERIAL ON THE READING COMPREHENSION OF FOURTH GRADERS WAS EXAMINED. RUDDELL'S FREQUENCY PATTERNS WERE USED. TWO PASSAGES WERE CONSTRUCTED -- THE FIRST WITH 4 HIGH FREQUENCY PATTERNS (PASSAGE A) AND THE SECOND WITH 4 LOW FREQUENCY PATTERNS (PASSAGE B). FACTORS WITHIN THE PASSAGES THAT WERE CONTROLLED WERE LENGTH, READABILITY, CONTENT, AND STYLE. TWO TAXONOMIES WERE USED TO GUIDE THE WRITING OF COMPREHENSION QUESTIONS. THE 14 QUESTIONS TESTED LITERAL COMPREHENSION, INFERENTIAL COMPREHENSION, EVALUATION, AND APPRECIATION. FIFTY-THREE FOURTH GRADERS AT TWO INTELLIGENCE LEVELS WERE GROUPED BY SEX AND RANDOMLY ASSIGNED A PASSAGE. ANALYSIS OF VARIANCE WAS USED TO ANALYZE THE DATA. PASSAGE A WAS COMPREHENDED BETTER THAN PASSAGE B. THE DIFFERENCE IN COMPREHENSION SCORES BETWEEN THE INTELLIGENCE LEVELS WAS SIGNIFICANT AT THE .05 LEVEL. THERE WAS NO SEX DIFFERENCE IN COMPREHENSION SCORES. CONCLUSIONS, REFERENCES, AND THREE APPENDIXES ARE INCLUDED. THIS PAPER WAS PRESENTED AT THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION CONFERENCE (CHICAGO, FEBRUARY 6-10, 1968). (BK)

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USING MULTIPLE CHOICE QUESTIONS TO MEASURE THE EFFECT ON COMPREHENSION OF MATERIAL WRITTEN WITH SELECT ORAL LANGUAGE PATTERNS*

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Introduction

Valuable information about the way children structure their oral language was provided when Strickland analyzed verbal utterances of elementary school children and subsequently determined the frequency with which each oral language pattern appeared. One aspect of her study concerned the degree to which language patterns in children's reading material are similar to children's oral language patterns. Investigating some implications of this problem, Ruddell (1963) selected patterns from Strickland's study (1962) that occurred with either a high or a low degree of frequency at the fourth grade level. He constructed six passages and tested fourth graders' reading comprehension of them. He found that the passages written with frequent patterns were comprehended significantly better than the passages written with infrequent patterns.

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In Ruddell's study (1963), reading comprehension was determined by the cloze procedure, by which every fifth word in the passages was deleted and a blank space left in its place; the reader's task was to fill in the blanks with the deleted words. Although it has been demonstrated that the cloze procedure is a valid measure of reading comprehension (Ruddell, 1963; Bormuth, 1966), studies have not analyzed its effect on the comprehension of passages that use select language patterns. This point is highly relevant. It seems reasonable to hypothesize that deletion of words in unfamiliar language constructions makes the task of filling in blank spaces considerably more complicated than deletion of words in familiar language constructions.

Deriving its impetus from the presumed bias of the cloze procedure, the present investigation was conducted for three reasons: (1) to continue probing the relationship between oral language patterns and comprehension of materials written with these patterns; (2) to follow the basic methodology of Ruddell's study (1963) with the exception of the cloze procedure; and (3) to use passages that were identical in content rather than merely related, as in Ruddell's work (1963).

Specifically, the hypothesis tested was that reading comprehension of a passage written with frequent oral language patterns is significantly grater than of a passage written with infrequent oral language patterns when comprehension is ascertained by multiple choice questions. The variables of sex and IQ were also considered.

Procedure

Materials. Because of their primary role in determining the outcome of the study, the materials will be discussed in some detail. Two passages

were constructed. One comprised the 4 high frequency patterns from Ruddell's IA passage (1963). The other passage comprised the 4 low frequency patterns used in Ruddell's IB passage (1963). Appendix A briefly describes how the patterns were originally selected. With the exception of language patterns, the two passages were made as similar as possible. Thus for each passage, the variables of length, readability, content and style were controlled in this manner: Length: Each passage was 254 words long in order to be comparable in length to Ruddell's materials (1963). Readability: Shown to be a consistent measure of readability, the Dale-Chall readability formula (1948) was used. The formula uses the two criteria of sentence length and the proportion of words not found on the Dale List of 3,000 Familiar Words. Information about the readability level of each passage is presented in Table 1. Content: Comets was chosen as the topic for both passages to eliminate the possibility that one topic would influence comprehension more favorably than the other by its greater appeal to interest, or by its greater familiarity to the subjects. Style: An expository style was used, as it seemed best suited to the science content.

Passage A was written first. Its 4 high frequency patterns appeared in direct proportion to the number of times they occurred in the oral language of fourth graders (Strickland, 1962). For passage B, it was necessary to rewrite the content using the 4 low frequency patterns in proportion to their appearance in the oral language of fourth graders (Strickland, 1962). Appendix A briefly describes how the proportions were determined, and Appendix B provides information about the frequency of each pattern used.

In writing passage B, an attempt was made to maintain the kernal idea of each pattern group from passage A, paragraph by paragraph. An example of the result is the sentence in passage A, which consists of the high frequency patterns 1 2 4 + 1 2 4 :

> Not all coments have tails, but a coment near the sun does grow one.

When rewritten with two low frequency patterns, 1 2b M_1 + 1 2 4 M_4, this is what the sentence became in passage B:

> Tails are not formed on all comets, but a comet does grow a tail if it nears the sun.

At times, the vocabulary as well as the word order had to be modified to accommodate the change to different language patterns. As an added control, however, the same "hard" words were used in both sets of materials. A word was "hard" if it did not appear on the word list used by the Dale-Chall readability formula.

Comprehension test. An analysis of several standardized reading tests for the fourth grade revealed conflicting conceptions of reading comprehension. Some tests focused exclusively on factual information gained directly from the material while others included higher level abilities like making inferences and drawing conclusions. Since a broad definition of reading comprehension was desired, Bloom's Taxonomy (1956) and the Taxonomy of Cognitive and Affective Dimensions of Reading Comprehension (1966), were used to guide the selection of test items.

Two pilot studies were conducted. Subsequently, revisions of the test were made and the final fourteen items were selected. An analysis of the items according to the reading taxonomy revealed that the following aspects of comprehension were being tested: literal comprehension, inferential comprehension, evaluation, and appreciation. The test was accepted as

meeting the investigator's criteria for sampling a variety of reading comprehension abilities.

Subjects. A suburban elementary school outside Madison, Wisconsin provided the population from which the sample was drawn. Fourth graders were designated as subjects if they had an IQ score at one of two levels: (1) 90-115, or (2) 120 and above. The former was termed low IQ and the latter high IQ for purposes of the study. IQ scores were used from the California Test of Mental Maturity, Short-Form IH, given during the second semester of third grade.

The 53-subjects who fit the criterion for a high or low IQ were grouped by sex and then randomly assigned to one of the two tasks, passage A or passage B. Data from all 53 subjects were used.

Collection of data. Testing took place in the spring. Approximately 15 minutes was needed for each of the three fourth grade classrooms. Each subject received the appropriate test booklet which consisted of four parts: (1) directions for reading the passage, (2) the passage itself, (3) directions for answering the questions, and (4) the comprehension questions. The subjects were directed to read the passage only once before turning to the questions; they could not look back at the passage. There was not time limit imposed.

Measurement

Reading comprehension of the passages was measured by fourteen sentence-completion multiple choice items. A test score was derived for each subject by totaling the number of correct responses to the items.

Analysis of the Data

The design was a 2 x 2 x 2 factorial with two tasks, two IQ levels, and two sexes. The dependent variable for the analysis was comprehension of the passages. The scores were analyzed by an unequal cell analysis of variance. The .05 level of significance was accepted; the F ratio was used.

Results

The difference between mean comprehension scores of the two passages was significant at the .05 level, as shown in Table 3. Passage A had the larger mean. Thus, the hypothesis was accepted. Table 2 provides information about the variability and central tendency of scores for both passages. The main purpose of the study was consequently realized in confirming Ruddell's major finding (1963). He stated that the differences between the means of his passages were significant at the .01 level.

When the subjects were grouped by high and low IQ, a difference between the mean comprehension scores of the intelligence levels was found to be highly significant at the .05 level. This information is reported in Table 3. There was no significant interaction. It seems that although the performance of one IQ group differed from the other, it remained consistent regardless of the passage read.

There was no significant difference between the performance of boys and girls on the comprehension tests. The finding, shown in Table 3, was also reported by Ruddell (1963), but closer observation of his results suggests that boys had a disproportionate amount of difficulty comprehending the low frequency passages. No such interaction between sex and task was found in the present study, in which boys and girls apparently did not vary their performance according to the passage read.

Conclusions

Within the limitations and restrictions of the investigation, these conclusions may be reached.

1. Reading comprehension of a passage written with language patterns that appear with a high degree of frequency in the oral language of fourth graders was significantly greater than reading comprehension of a passage written with language patterns that appear infrequently in the oral language of fourth graders.

2. IQ level was related to reading comprehension of passages written with language patterns that appear either frequently or infrequently in the oral language of fourth graders.

3. Sex was not significantly related to reading comprehension of passages written with language patterns that appear either frequently or infrequently in the oral language of fourth graders.

Discussion

The following limitations severely restrict generalizations that can be made: (1) Two assumptions were accepted in using Strickland's tabulation of oral language patterns (1962): (a) children's oral language patterns have not changed significantly from the time of her study six years ago, and (b) the frequency of select oral language patterns was not significantly different for the population used in the present study. (2) Most of the subjects had above-average IQ scores which reflected ability typical of their community. The results might be different from a more representative population. (3) The comprehension test comprised only fourteen items.

Despite different methods of determining reading comprehension, Ruddell's study (1963) and the present one, indicate a relationship between the frequency of children's oral language patterns and reading comprehension of these patterns. More specifically, the use of multiple choice questions in this study suggests that children's ability to read for such things as details, the main idea, and a sequence of events is affected by the use of certain frequent and infrequent oral language patterns.

These findings need to be confirmed with more rigorously tested materials, a diverse population, and different grade levels. Then, with a larger body of evidence, these implications will warrant thoughtful consideration:

(1) Teachers and writers of classroom materials need to be aware of the relationship between the structure of children's oral language and successful reading. The use of frequent oral patterns in material for beginning readers might simplify and clarify the transition from spoken to written language.

(2) Since certain patterns are relatively difficult to comprehend, and since some of these patterns appear in basal readers at the primary level (Strickland, 1962), teachers should develop a program to assist children in reading increasingly complex structures.

TABLE 1. READABILITY OF THE TWO TEST PASSAGES USING THE DALE-CHALL FORMULA

Passage	Number of words in passage	Average sentence length	Words per hundred not on Dale list	Reading difficulty by grade
A (high)	254	9.8	1.97	4.43
B (low)	254	12.7	1.97	4.58

TABLE 2. MEAN, RANGE, AND STANDARD DEVIATION OF CLOZE COMPREHENSION SCORES FOR THE TEST PASSAGES

Test	Mean	Range	Standard Deviation
A (high)	9.08	2-14	2.1
B (low)	7.19	3-13	1.5

TABLE 3. ANALYSIS OF VARIANCE OF CLOZE COMPREHENSION SCORES CONSIDERING THE VARIABLES OF HIGH AND LOW FREQUENCY PATTERNS, SEX, AND IQ

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio
Frequency (high and low)	32.9294	1	32.9294	9.02675*
Sex	9.19	1	9.19	2.52056
IQ (high and low)	153.25670	1	153.25670	42.01138*
F x S	19.51998	1	19.51998	2.60966
F x IQ	7.87155	1	7.87155	2.15778
S x IQ	4.10336	1	4.10336	1.12483
F x S x IQ	211.53898	1	211.53898	1.02939
Within	164.15913	45	3.648	

*Significant at the .05 level.

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APPENDIX A

Selection and Proportions of the Oral Language Patterns*

Selection of oral language patterns. The patterns for each passage were drawn from Strickland's tabulation of the frequency with which patterns appeared in the oral language of 75 fourth graders (1962). The 3,142 emissions she recorded for this grade level fell into 722 different language patterns which ranged from a frequency of 1 to 202. In the present study, those patterns with a frequency range of 25-202 were considered high frequency patterns, and those with a frequency range of 2-15 were considered low frequency patterns, according to Ruddell's designation (1963). The following are among the criteria used in selecting the patterns for passages A and B: (a) a pattern which began and terminated with a T was to be disgarded because of the restriction placed on length by the readability formula; (b) a pattern ending with a T was to be followed by a pattern beginning with a T.

Proportions of the oral language patterns. In following Ruddell's method (1963), two steps were taken to determine the frequency with which each oral language pattern would appear in the written material. First, a frequency value (f.v.) was found by dividing the total number of emissions in the frequency table by the frequency of each pattern (Strickland, 1962). To obtain the f.v. of the first pattern in Appendix B, for example, the total number of emissions, 3,142, was divided by 202, the frequency for the 1 2 4 pattern. The result, .0643, was the f.v. for that pattern.

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*See Ruddell (1963) for greater detail.

APPENDIX A (continued)

In the second step, the 4 frequency values for passages A and B were totaled. The total was then divided by the f.v. of each pattern in the passage. The quotient was multiplied by 100 to determine a proportion for each pattern. In passage B, for example, the 4 frequency values totaled .0154. The proportion for the 1 2 3 4 pattern was calculated by dividing .0154 by .0047, the f.v. for this pattern. When multiplied by 100, the resulting quotient was 30. Thus 30 percent of the patterns in passage B were to be 1 2 3 4.

APPENDIX B

The Similarity Index for the Two Controlled Reading Passages*

Reading passage	Language pattern	Oral language frequency value	Similarity index (total of frequency values)	Percent each pattern represents	Proportional number of patterns used	Number of patterns actually used
A	High Frequency Patterns					
	1 2 4	.0643		34	12	12
	T 1 2 4	.0497	.1875	27	9	8
	1 2 4 + T	.0391		21	7	8
	1 2b 5	.0344		18	6	6
B	Low Frequency Patterns					
	1 2 3 4	.0047		30	8	8
	1 2 M_3	.0037	.0154	24	6	6
	1 2b M_1 + T	.0035		23	6	6
	T 1 2 4 M_4	.0035		23	6	6

*Borrowed from Ruddell (1963).

APPENDIX C

Key to the Language Patterns Used

1 subject

2 verb

2b passive verb or verb of the to be class or copulative verb

3 indirect object

4 direct object

5 predicative nominative

M_1 movable of place

M_3 movable of time

M_4 movable of purpose or cause

\+ a connector

T marker indicating the pattern was preceded or followed by another pattern